

B.E. (Civil Engineering) Eighth Semester (C.B.S.)
Elective-III : Advanced Steel Design

P. Pages : 2

NRJ/KW/17/4682

Time : Three Hours



Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Assume suitable data whenever necessary.
 7. Illustrate your answers whenever necessary with the help of neat sketches.
 8. Use of non programmable calculator is permitted.
 9. ISI Hand book for structural steel section, IS 800, IS 456 IS 875 may be consulted.

1. Design a simply supported crane girder to carry an electric overhead travelling crane, for the following data : **20**
- i) Crane capacity = 300 kN
 - ii) Weight of crane including crab = 200 kN
 - iii) Weight of Crab = 100 kN
 - iv) Span of gantry girder = 5 m
 - v) End clearance = 1.2 m
 - vi) Wheel base = 3.2 m
 - vii) c/c of gantry girder rails = 15 m
 - viii) Electrically operated single crane is to be considered.
 - ix) Yield stress of steel = 250 N/mm².

OR

2. Design a roof truss for an industrial building given the following data : **20**
- Overall length = 50 m
 Overall width = 15.5 m
 Width c/c of roof columns = 16.0 m
 Height of columns = 10.0 m
 Roofing material = Asbestos cement sheets
 Side covering = Asbestos cement sheets.
3. a) Explain the various types of bearing in detail. **5**
- b) Design rocker bearing for a 28 m span truss girder railway bridge with the following data, the reaction due to dead load, live load and impact load is 1250 kN. The vertical reaction due to overturning effect of wind load at each of the girder is 130 kN. The lateral load due to wind load effect at each bearing is 75 kN. The tractive force and braking force are 981 kN and 686 kN respectively. **15**

OR

4. Design a foot bridge for the following particulars. 20
 Type of girder = N-Type truss
 Span of girder = 16 m c/c
 Spacing of cross girder = 4m c/c
 Clear walking width between main girder = 4 m
 Live load = 4 kN/m²
 Flooring = Timber planks on cross girder
 Design timber plank, cross girder, rakers, central top chord & bottom chord member.

5. a) Design an open web section for fixed beam of span 6m & subjected to a UDL of 35 kN/m on entire span. 10
 b) Enlist the types of bearings. 5
 c) What are the factors to be considered while selection of a bridge site ? 5

OR

6. Design rectangular steel bunker of 20 m length & 10 m width supported on eight columns (four along each long side) to store coal of bulk density 5.5 kN/m³ & angle of internal friction 30 degree, height of vertical portion is 4m, height of hopper portion is 5m. 20
7. a) Explain the composite construction in detail. 7
 b) Enlist the types of welding techniques. Explain in detail. 7
 c) Explain the use of shear connector in composite section. 6

OR

8. Design the beam of composite construction to the following requirements. 20
 Flange width provided by slab = 1400 mm
 Thickness of slab = 80 mm
 Prefabricated unit shall be a steel beam section
 Span of beam = 14 m
 Total load on beam = 22 kN/m
 Use M-20 concrete
